Space Weather Forecast

Issued on Thursday, 02 May 2024 at 12:06 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate-class flares likely with a chance of Strong flares through the period. Slight chance of a G1/Minor geomagnetic storm days 3 and 4.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is at Moderate levels, with the biggest Moderate-class flare from a region which is approaching the west limb. This region remains the largest and most complex on the visible disc, although as the region is now approaching the west limb analysis is becoming more difficult. All remaining regions are smaller, despite two of them increasing in size and complexity, especially the region in the northeast, which produced the other Moderate-class flare in the period.

A filament (arc of the Sun's plasma) eruption beginning at 01/0600 UTC close to the large sunspot in the southwest disc resulted in a notable Coronal Mass Ejection (CME) signature in coronagraph imagery. Further analysis has revealed a possible Earth-directed component late on day 3 (4th), but more likely early on day 4 (5th). A region in the northeast emitted two narrow CME's, for which analysis is on-going for, but currently the CME's are not expected to be Earth directed.

Solar Wind / Geomagnetic Activity: Solar winds have been at background levels throughout. The magnetic field was Moderate throughout, while the all-important north-south component was positive at the start of the period, but became mostly negative (southward directed) due to the arrival of a weak glancing CME (Coronal Mass Ejection). The resultant Geomagnetic activity was Quiet (Kp 0-2) throughout, despite the arrival of a weak CME towards the end of the period.

Energetic Particles / Solar Radiation: Solar radiation was at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate solar activity is likely to continue with further Moderate flares, and a slight chance of Strong flares, principally from the large and complex group in the southwest disc until it rotates behind the west limb. The developing region in the northeast, and returning regions likely to rotate onto the disc later in the period, are also potential sources of further Moderate flares.

Solar Wind / Geomagnetic Activity: A weak glancing blow CME arrived early on Day 1 (2nd) with no impacts observed so far, with some uncertainty in the source of the CME. There is a risk of a glancing blow from another CME that left the Sun on the 29th, arriving sometime during tomorrow (3rd May). A notable CME that left the disc around 01/0600 UTC from the southwest disc is now expected to give a glancing blow either late on day 3 (4th) or more likely early on day 4 (5th).

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Met Office Space Weather Forecast

Solar winds are currently at background levels (around 360km/s) despite the arrival of a weak CME early on day 1 (2nd). A potential slight enhancement in the wind speeds may occur later today (2nd May) due to a coronal hole fast wind, although this feature appears to be smaller and less potent than on previous rotation, therefore confidence is low. Conditions are then expected to gradually return towards background tomorrow (3rd May). Then a further enhancement in the solar wind from another coronal hole (near centre-disc) is likely tomorrow, with wind speeds reaching elevated levels later tomorrow, then persisting through days 3 and 4 (4th and 5th May). In addition, a glancing blow from the 1st May CME is possible from late day 3, but more likely into early day 4.

Geomagnetic activity is expected to be generally Quiet to Unsettled at first, but with a chance of Active intervals at times due to the potential HSS and CME arrival today. From late day 3 (4th) into day 4 (5th) activity is expected to increase to become Unsettled to Active, with a chance of Minor geomagnetic storm intervals.

Energetic Particles / Solar Radiation: Solar radiation is most likely to remain at background levels through this period. There is a chance for an S1/Minor Storm or greater event, should any proton-rich flares occur, primarily from the large, complex sunspot group near the west limb before it rotates onto the far side.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	10	40	50
Strong	G3	No	1	1	5	10
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	75	75	50	20
Very Active	R3 to R5 X	No	20	20	10	1

Solar Radiation Storms - (High Energy Protons):

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Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	20	20	10	1
Very Active	**≥ S3 ***	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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